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Amendments to the Claims

This listing of Claims will replace all prior versions, and listings, of Claims in the patent application:

Listing of Claims

- 1. (Withdrawn) A detector oligonucleotide, comprising at least two pairs of a donor fluorophore and a quencher molecule in close proximity, wherein said donor fluorophore and said quencher molecule in each said pair are separated by a cleavage site that is cleavable in a double-stranded form, and wherein cleavage at said cleavage site is capable of creating a detectable signal that indicates the presence of a target nucleic acid.
- 2. (Withdrawn) A single-stranded first detector oligonucleotide, comprising at least two pairs of a donor fluorophore and a quencher molecule in close proximity, wherein said donor fluorophore and said quencher molecule in each said pair are separated by a cleavage site that is cleavable in a double-stranded form, and wherein the cleavage site is double-stranded when the first detector oligonucleotide forms a duplex with a second oligonucleotide that is capable of being formed in the presence of a target nucleic acid.
- 3. (Withdrawn) The detector oligonucleotide of claim 2, wherein at least one said donor fluorophore is selected from the group consisting of fluorescein, sulforhodamine 101, pyrenebutanoate, acridine, ethenoadenosine, eosin, rhodamine, and erythrosine.
- 4. (Withdrawn) The oligonucleotide of claim 2, wherein at least one said quencher molecule is selected from the group consisting of DABCYL, DAMBI, DABSYL and methyl red.
- 5. (Withdrawn) The oligonucleotide of claim 2, wherein said donor fluorophores and said quencher molecules are separated by about 5 to 20 nucleic acid bases that comprise a cleavage site.

- 6. (Withdrawn) The oligonucleotide of claim 5, wherein said donor fluorophores and said quencher molecules are separated by about 6 to 8 nucleic acid bases that comprise a cleavage site.
- 7. (Withdrawn) The oligonucleotide of claim 2, wherein said cleavage site is cleavable by a chemical cleavage reagent.
- 8. (Withdrawn) The oligonucleotide of claim 2, wherein said cleavage site is cleavable by an endonuclease.
- 9. (Withdrawn) The oligonucleotide of claim 8, wherein said endonuclease is selected from the group consisting of Hinc II, Noi I, and BsoB1.
- 10. (Withdrawn) The oligonucleotide of claim 2, comprising ten donor/quencher pairs.
- 11. (Withdrawn) The oligonucleotide of claim 10, comprising 50 donor/quencher pairs.
- 12. (Withdrawn) The oligonucleotide of claim 2, wherein the first detector oligonucleotide comprises a first portion at a 5' terminus that is capable of forming a duplex with a first portion at a 3' terminus of a second oligonucleotide, wherein the second oligonucleotide comprises a second portion that is complementary to a target nucleic acid and a third portion at a 5' terminus of the second oligonucleotide that comprises one strand of an endonuclease recognition site.
- 13. (Withdrawn) The oligonucleotide of Claim 2, wherein said first detector oligonucleotide comprises a first portion capable of forming a duplex with a third oligonucleotide, wherein said third oligonucleotide comprises two portions: (1) a first portion having a sequence capable of forming a duplex with a target nucleic acid and (2) a second portion capable of forming a duplex with said first portion of said first detector oligonucleotide.
- 14. (Withdrawn) The detector oligonucleotide of Claim 13, wherein said first portion is at the 5' terminus of said first detector oligonucleotide.

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- 15. (Withdrawn) The oligonucleotide of Claim 2, wherein said first detector oligonucleotide comprises a first portion capable of forming a duplex with a third oligonucleotide, wherein said third oligonucleotide comprises two portions: (1) a first portion having a sequence complementary to a target nucleic acid and (2) a second portion capable of forming a duplex with said first portion of said first detector oligonucleotide.
- 16. (Withdrawn) A partially double-stranded detector oligonucleotide, comprising at least two pairs of a donor fluorophore and a quencher molecule in close proximity, wherein said donor fluorophore and said quencher molecule in each said pair are separated by a cleavage site, wherein said partially double-stranded detector oligonucleotide comprises a single-stranded portion that is capable of forming a duplex with a target nucleic acid.
- 17. (withdrawn) The oligonucleotide of claim 16, wherein at least one of said cleavage sites is cleavable by a chemical cleavage reagent.
- 18. (Withdrawn) The oligonucleotide of claim 16, wherein at least one of said cleavage sites is cleavable by an endonuclease.
- 19. (Original) A method for detecting a target nucleic acid, comprising:
 - a. contacting (i) a first detector oligonucleotide comprising a single-stranded portion that comprises at least two pairs of a donor fluoropore and a quencher molecule in close proximity, wherein said donor fluorophore and said quencher molecule in each said pair are separated by a cleavage site, with (ii) a single-stranded second oligonucleotide, the presence of which is indicative of the presence of the target nucleic acid, to form a duplex between said first and second oligonucleotides;
 - extending the duplex to make said single-stranded portion of the first detector oligonucleotide double-stranded;
 - c. cleaving at least one of said cleavage sites; and
 - d. detecting said donor fluorophores,

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wherein a detectable change in fluorescence parameter of said donor fluorophores is indicative of the presence of said target nucleic acid.

- 20. (Currently Amended) The method of claim [[18]] 19, wherein the first oligonucleotides comprises a first portion at a 5' terminus of the first oligonucleotide that forms a duplex with a first portion at a 3' terminus of the second oligonucleotide.
- 21. (Currently Amended) The method of claim [[18]] 19, further comprising amplifying the second oligonucleotide.
- 22. (Original) The method of claim 21, wherein the second oligonucleotide is amplified before step (a).
- 23. (Original) The method of claim 21, wherein the second oligonucleotide comprises one strand of an endonuclease recognition site in a third portion of the second oligonucleotide that is 5' of said second portion that is complementary to a target nucleic acid.
- 24. (Original) The method of claim 21, wherein the amplifying is by a method selected from the group consisting of strand displacement amplification (SDA), polymerase chain reaction (PCR), ligase chain reaction, self-sustained sequence replication (3SR), Q beta replicase-based amplification, solid phase amplification, nucleic acid sequence-based amplification (NASBA), rolling circle amplification, and transcription mediated amplification (TMA).
- 25. (Original) The method of claim 23, wherein the amplifying is by the method of strand displacement amplification.
- 26. (Original) method of claim 19, wherein said detecting comprises measuring a fluorescent emission of said donor fluorophores.

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- 27. (Original) The method of claim 19, wherein said at least one of said pairs is selected from the group of donor and quencher molecules consisting of fluorescein/Rhodamine X, Rhodamine X/Cy5, or fluorescein/DABCYL.
- 28. (original) A method for detecting a target nucleic acid, comprising:
 - a. (i) hybridizing a primer P₁ to said target nucleic acid and (ii) extending P₁ by use of a polymerase to form a Strand 1, wherein the primer P₁ comprises an endonuclease recognition site at a 5' portion of said primer P₁ that does not hybridize to the target nucleic acid;
 - b. (i) hybridizing a bumper B₁ to said target nucleic acid upstream from said primer P₁ and (ii) extending the bumper B₁ and removing Strand 1 from said target nucleic acid;
 - c. hybridizing an adaptor to Strand 1 and a primer P₂ to Strand 1, wherein the primer P₂ hybridizes upstream of the adapter,
 - d. (i) extending the adapter to form a Strand 2, and (ii) extending the primer P₂ to remove Strand 2 from Strand 1;
 - e. (i) hybridizing the primer P₁ to Strand 2 and (ii) extending the primer P₁ to form a primer P₁-extended strand;
 - f. (i) nicking the primer P₁-extended strand at the endonuclease recognition site incorporated into the primer P₁-extended strand and (ii) extending from the nick site to form a Strand 3 and to bump the primer P₁-extended strand that is downstream of the nick site;
 - g. hybridizing Strand 3 to a portion of an oligonucleotide, wherein the oligonucleotide comprises multiple pairs of donor fluorophores and quenchers, wherein the donor fluorophore and the quencher in each said pair are separated by a site that is cleavable when said cleavage site is double-stranded;
 - h. (i) extending Strand 3 to make the cleavage sites double-stranded and (ii) cleaving at least one of the cleavage sites; and
 - i. detecting said donor fluorophores,

wherein a detectable change in a fluorescence parameter of said fluorophores is indicative of the presence of said target nucleic acid.

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- 29. (Withdrawn) A kit, comprising a single-stranded first detector oligonucleotide, comprising at least two pairs of a donor fluorophore and a quencher molecule in close proximity, wherein said donor fluorophore and said quencher molecule in each said pair are separated by a cleavage site that is cleavable in a double-stranded form, and wherein the cleavage site is double-stranded when the first detector oligonucleotide forms a duplex with a second oligonucleotide capable of being formed in the presence of a target nucleic acid.
- 29. (Withdrawn) The kit of claim 29, further comprising an adapter oligonucleotide that comprises a first portion, which is capable of forming a duplex with the complement of a target oligonucleotide, and a second portion, the complement of which is capable of forming a duplex with the first portion of said detector oligonucleotide.